Patent claims

1. A method for operating an image system (10) of
    an imaging medical examination device (1), the
5   image system (10) having a reception unit (11)
    for receiving a plurality of signals arising at
    different locations, and a display unit (19) for
    the imaging representation of pixels, the pixels
    each being assigned at least one signal,
10 characterized in that
    an event of the undisturbed operation of the
    medical examination device (1) automatically
    triggers a defect determination (63) for
    determining a defective pixel possibly present
15 in the image.

2. The method as claimed in claim 1,
    characterized in that
    the triggering event is derived from an
20 operating process which does not serve for the
    defect determination (63), in particular from an
    operator's control process which does not serve
    for the defect determination (63).

25 3. The method as claimed in claim 1 or 2,
    characterized in that
    the triggering event is derived from a switch-on
    process performed on the medical examination
    device (1).

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4. The method as claimed in one of claims 1 to 3,
    characterized in that
    the triggering event is derived from a
    calibration process performed on the medical
35 examination device (1).

5. The method as claimed in one of claims 1 to 4,
    characterized in that

the triggering event is generated at a defined point in time before, during or after an image acquisition procedure, in particular before, during or after a patient examination or a scan.

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6. The method as claimed in one of claims 1 to 5, characterized in that
    the triggering event is generated by a counting process.

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7. The method as claimed in claim 6, characterized in that
    the counting process counts a process which is repeated during operation of the medical

15   examination device (1), in particular a switch-on process, a calibration process and/or examination process.

8. The method as claimed in one of claims 1 to 7, characterized in that

20   the triggering event is generated by a time measuring process.

9. The method as claimed in one of claims 1 to 8,

25   characterized in that
    after the defect determination (63), a correction process (67) is automatically triggered if a defective pixel was detected.

30 10. The method as claimed in claim 9, characterized in that
    during the correction process (67), the assignment of the defective pixel to its signal is canceled and, instead of this, the pixel is

35   assigned one or more signals of one or more other pixels.

11. The method as claimed in claim 9 or 10,

characterized in that
in connection with the defect determination
after carrying out a first correction process in
which already known image defects are corrected,
5   the corrected image is analyzed in order to
determine further defects or defects that are
still present, which are corrected in a second
correction process.

10 12. The method as claimed in claim 11,
characterized in that
the image is filtered after the first correction
process, after which the filtered image is
analyzed.

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13. The method as claimed in claim 12,
characterized in that
a median filter or a high-pass filter is used as
the filter.

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14. The method as claimed in one of claims 11 to 13,
characterized in that
in the context of the analysis, the pixel-
related signals are compared with one or more
25   threshold values.

15. The method as claimed in one of claims 11 to 14,
characterized in that
the analysis result is used to generate a new
30   defect map (53), which describes the detected
defect or defects that is or are new or still
present, and which is used to effect the
correction in the second correction process.

35 16. The method as claimed in one of claims 11 to 15,
characterized in that
in the context of the first correction process,
the image is corrected using an old defect map

(50), which describes already known defects.

17. The method as claimed in claims 15 and 16,
characterized in that
5   the old defect map (50) is updated using the new
defect map (53).

18. The method as claimed in claim 17,
characterized in that
10   the updating is effected only when one or more
defects that are new or still present are
detected.

19. The method as claimed in one of claims 11 to 18,
15   characterized in that
a flat-fielding correction of the image is
effected in the context of the first correction
process.

20 20. The method as claimed in one of claims 1 to 19,
characterized in that
after the defect determination (63), a message
is automatically sent via a data link (47) to a
service device (49) if a defective pixel was
25   detected.

21. The method as claimed in one of the preceding
claims,
characterized in that
30   a pixel is detected as defective if the assigned
signal falls below a minimum value.

22. The method as claimed in one of the preceding
claims,
35   characterized in that
a pixel is detected as defective if the noise in
the assigned signal exceeds a maximum value.

23. The method as claimed in one of the preceding
    claims,
    characterized in that
    the defect determination (63) is carried out on
5   a stored image.

24. An imaging medical examination device (1) having
    an image system (10), the image system (10)
    having a reception unit (11) for receiving a
10 plurality of signals arising at different
    locations, and a display unit (19) for the
    imaging representation of pixels, the pixels
    each being assigned at least one signal,
    characterized by
15 a detection device (31) for automatically
    determining a defective pixel possibly present
    in the image, in which case the detection device
    (31) can be activated by an event of the
    undisturbed operation of the medical examination
20 device (1).

25. The examination device as claimed in claim 24,
    characterized in that
    the detection device (31) can detect a pixel as
25 defective if the assigned signal falls below a
    minimum value.

26. The examination device as claimed in claim 24 or
    25,
30 characterized in that
    the detection device (31) can detect a pixel as
    defective if the noise in the assigned signal
    exceeds a maximum value.

35 27. The examination device as claimed in one of
    claims 24 to 26,
    characterized by
    a correction device (41) for automatically

eliminating a defective pixel that has possibly
been detected, in which case the correction
device (41) is connected to the detection device
(31) and can be activated by the latter if a
defective pixel is detected.

28. The examination device as claimed in claim 27,
characterized in that
the detection device (31) is designed for
analysis of the image that has been corrected in
the correction device (41) a first time with
regard to already known defects, for the purpose
of determining defects that are new or still
present, and the correction device (41) is
designed for renewed correction of the corrected
image with regard to the defect or defects that
is or are new or still present.

29. The examination device as claimed in claim 28,
characterized in that
the detection device (31) has a filter for
filtering the image after the first correction
process and an analysis means (42) for
determining one or more defects that is or are
new or still present.

30. The examination device as claimed in claim 29,
characterized in that
the filter is a median filter or a high-pass
filter.

31. The examination device as claimed in one of
claims 28 to 30,
characterized in that
the analysis means (42) is designed for
comparing the pixel-related signals with one or
more threshold values for the purpose of
determining a defect.

32. The examination device as claimed in one of
    claims 28 to 31,
    characterized in that
    the analysis means (42) or the detection device
5   (31) is designed for generating a new defect map
    (53), which describes the detected defect or
    defects that is or are new or still present, and
    the correction device (41) is designed for
    correcting the image in the second correction
10 process using the new defect map (53).

33. The examination device as claimed in one of
    claims 28 to 32,
    characterized in that
15 the correction device (41) is designed for
    correcting the image using an old defect map
    (50), which describes already known defects, in
    the context of the first correction process.

20 34. The examination device as claimed in claims 32
    and 33,
    characterized in that
    the detection device (31) or the correction
    device (41) is designed for updating the old
25 defect map (50) using the new defect map (53).

35. The examination device as claimed in one of
    claims 28 to 34,
    characterized in that
30 the correction device (41) is designed for
    carrying out a flat-fielding correction of the
    image in the context of the first correction
    process.

35 36. The examination device as claimed in one of
    claims 24 to 35,
    characterized in that
    the detection device (31) has a data interface

(45) for sending a message to a service device
(49), in which case the message can be sent
automatically by the detection device (31) if a
defective pixel is detected.

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37. The examination device as claimed in one of
claims 24 to 36,
characterized in that
the detection device (31) is connected to an
10 image memory (40), from which it is possible to
retrieve an image which was generated by the
image system (10) at an earlier point in time.